

Electromagnets



As long as the electricity is turned on, an electromagnet can lift tons of metal.

You have learned that a magnet has a magnetic field around it. This field is the area in which the magnet acts on other objects. Magnetism is related to electricity. When electricity flows through a wire, it makes a magnetic field around the wire.

Suppose an electric wire is bent into a coil. When electricity flows through the wire, a magnetic field forms around the whole coil. The coil becomes a kind of magnet. It has north and south poles, just like a magnet.

If an iron bar is placed inside a coil of wire when electricity flows through it, an **electromagnet** is formed. An electromagnet is a much more powerful magnet than a coil of wire alone. When more wire is looped around the iron, the electromagnet becomes even stronger.

Doorbells are made from a tiny electromagnet. A large electromagnet is so powerful it can lift tons of iron. It can lift cars in junkyards, and even trains. But as soon as the flow of electricity is turned off, an electromagnet loses its magnetism. Then it drops whatever it was holding.

Not only can electricity make magnetic fields, magnetic fields can make electricity. If a magnet is moved in and out of a coil of copper wire, electricity begins to flow through the coil. This way of making electricity is called **electromagnetic induction**. Generators, which supply electricity, make their electricity by electromagnetic induction.

A. Answer True or False.

1. Magnetic fields can make electricity. _____
2. Electricity cannot make magnetic fields. _____
3. As soon as the flow of electricity is turned off, an electromagnet gets stronger. _____
4. If a magnet is moved in and out of a coil of copper wire, electricity begins to flow through the coil. _____

B. Fill in the missing words.

1. Magnetism is related to _____. (electricity, fuses)
2. A magnet has a magnetic field _____ it. (inside, around)
3. When electricity flows through a wire, _____ forms around the wire. (electromagnetic induction, a magnetic field)
4. If an electric wire is bent into a _____, and electricity flows through it, the coil becomes a kind of magnet. (square, coil)
5. If an iron bar is placed inside a coil of wire when electricity flows through it, _____ is formed.
(an electromagnet, a wire)
6. An electromagnet is a much _____ powerful magnet than a coil of wire alone. (more, less)
7. Generators make electricity by _____.
(electromagnetic induction, magnets)

C. Use each pair of words to write a sentence about electromagnets.

1. iron bar _____

2. copper coil _____
